Electronic Plan Submittal

A status/update report to the Building Development Commission

Part 1: Executive Summary

In the February 19, 2002 BDC meeting, advisory board members requested an update on the status of Electronic Plan Submittal (EPS). This report responds to the BDC request in 4 parts:

- Part 2: a brief summary of data collected from authorities across the country
- Part 3: detail on data collected from each authority
- Part 4: overview of virtual plan rooms and other options
- Part 5: summary of Department and County hands on work to date with EPS

The questions we've tried to answer in this research are: a) what's out there in available EPS tools, and b) what are other authorities doing on the EPS front. We started out contacting 5 code enforcement authorities across the country known for their advanced use of technology; Houston, Fairfax County, Va., Phoenix, Clark County-Las Vegas and West Palm Beach, Fl.. This mushroomed into a final survey of 18 authorities across the country, as we chased down leads or rumors that someone had tested EPS or placed an EPS system in service. All authorities were asked the same questions, focusing on:

- Any research conducted on EPS and conclusions from same.
- Preferred platform/software, vendor or source, estimated cost and time frame to implement.
- Any problems noted, or if research abandoned, why?

Sixteen Authorities responded to the survey in varying degrees of detail. Basically, here's what we've concluded from the research.

- 1. No authority in the US, to the best of our knowledge, is using an EPS system for all commercial project plan review, available for all electronic drawing formats.
 - The authorities contacted are the recognized leaders in use of technology in code enforcement. None of them have an EPS system up and running.
- 2. The leaders in advancing this technology are at least 1-2 years away from putting something in place. Some of them (Houston) no longer even place a time line on startup. Others (Denver) say it's going to be another 5 years.
- 3. There are problems/concerns consistently noted, even by enthusiastic authorities, including:
 - Maintaining security of drawings (no changes by other than A/E's)
 - The ability to handle various drawing formats, not just CADD
 - The file size for drawings is huge, often exceeding server limits
 - High cost of monitor equipment, maintenance and replacement
 - Inability to quickly link or move through documents, to details or blown up plans
 - Complex printing process after review is complete, as well as electronic stamping
 - Use of electronic seals and signatures in some states (including North Carolina)

- 4. At least two authorities noted the problems are so significant, they have abandoned plans to use EPS in the near future. It merits noting both these authorities ran tests on EPS. One (San Diego) appeared to be very extensive, and led to the conclusion EPS actually slowed up plan review time.
- 5. Estimated costs are wide-ranging and not insignificant in scale. Various authority EPS project budgets, from planning to system startup, ran from \$500,000 to \$5,000,000.

The authority data included in this report indicates the Department should proceed cautiously in pursuing an EPS system. The cost will not be insignificant, but if customer demand is extensive enough, it may still merit initiating EPS. It may be appropriate, at this time to perform an extensive customer survey on the demand for EPS; if 80% of the customer base indicates a need, moving forward makes sense. Conversely, if only 10-20% of customers indicate a need, the Department and BDC will have to carefully weigh focusing significant resources on a narrow customer segment.

Another significant consideration the Department and BDC must weigh is the impact of EPS on Commercial Plan Review turnaround time. To date, an underlying assumption in almost all work on EPS is that it will speed up plan review and reduce turnaround time. Some authority research indicates the opposite; even after the learning curve settles out, plan review time actually takes longer. If the benefit to customers outweighs any loss of plan review time, this would become an issue of added staff resources.

This report was prepared by Jim Bartl, Wendy Gigante and Kari Lanning. Follow up inquiries should be directed to those persons.

Part 2: Research Summary

Authority	EPS currently available	research into EPS	plan to implement EPS	current thinking on EPS	dept. size staff	dept size budget
Houston, TX	no	on hold	yes	working on imaging and transfer by Inet: problems; security, multi-format & file size	big	big
Fairfax County, VA	no	completed	?	maybe in the future, current tech barriers make it impractical	151 FTE	not available
West Palm Beach, FL	no	on going	will test	looking at EPS via digital archival, will conduct plan review station test soon	59 FTE	\$6.5m
Phoenix, AZ	no	on going	?	ongoing study of EPS but have several concerns; no time line for implementation	350 FTE	not available
Clark County, NV	no	completed	no	see little benefit; see problems with software, computer load, printing, etc	not available	not available
Santa Clara, CA	no	on hold	yes	work on this is a year away	?	\$2.4m
San Jose, CA	no	completed	not now	postponed implementation; technical issues and lack of customer demand	173 FTE	\$23m
Palm Beach County, FL	no	starting	?	beginning automation; starting this part with records management	380 FTE	\$23.77m
Jacksonville, FL	no	starts 03	yes	starting imaging; start work on EPS in 03	107 FTE	\$8m+/-
Tampa, FL	no	no	yes	EPS will be Phase II of current project, 2 years out, with digital archiving	100 FTE	not available
Austin, TX	no	completed	no	Tried EPS and hated it; used CADD; data was too big for system	104 FTE	\$4.2m
San Antonio, TX	no	no	yes	EPS will be part of new document management system, 2 years out	185 FTE	\$9.3m
Indianapolis, IN				no response		
Norfolk, VA	no	pending	?	EPS may follow electronic plan storage	47 FTE	\$1.5m
Denver, CO	no	ongoing	yes	5 years to implement; cost of \$5 m in hardware and software upgrades.	135 FTE	\$10.4m
Seattle, WA				no response		
San Diego, CA	no	complete	no	ran pilot Oct, 00; too many problems, slower and more complicated for staff	430 FTE	\$42m
Jupiter, FL	no	on hold	yes	project on back burner for a year or two	40 FTE	\$2.5m

See the following Part 3: Research Detail for each authorities EPS status and department size information.

Part 3: Research Detail

Ranked by technology sophistication

3.1 Houston, TX

a. Contact: Al Largent, Deputy Director (ph 713-535-7501)

b. EPS status

Their effort has been slowed down because they have focused on use of palm pilots in the field, as well as an imaging system, which they see as paralleling digital submittal. They are working with Excella on the transfer of drawings by internet, and the product seems good; they are the only one who have done this successfully; still, they have run into problems on this. Specifically, obstacles are: a) security, b) handling various types of drawing formats (still), and c) server limits after A/E drawings go past a few pages. In addition, imaging poor drawings is a problem as well. They've built a separate website for this when it's up and running.

Currently they don't have a time frame of when it will be up and running (original target, 2nd qtr 2002). Don't know of anyone else who has this in place for commercial.

c. Authority data:

- Size of jurisdiction: 617 sq. miles
- Staff count: 273 FTE, 74 plan review (including support), 171 inspectors (including support)
- Permits issued/year: 145,000
- B/E/M/P inspections per year: 462,000 +/-
- Annual budget: \$25m; fully fee funded; they maintain a reserve target of \$6m +/-

3.2 Fairfax County, VA

a. Contact: Steve Garnier (703-324-1555, e-mail; stephen.garnier@fairfaxcounty.gov)

b. EPS status

They've done a lot of research around the country on this, visiting Silicon Valley and Sacramento, as well as calls to LA (in the same technology boat as Fairfax), Houston, Montgomery County (VA), Seattle, New Jersey, San Jose and San Francisco. Haven't found anyone with EPS up and running, all say "no, not quite yet". The most anyone is doing is receiving info electronically. So tech barriers have been reduced, but it still seems impractical to do this.

They found most people contacted to be behind them in technology, except for LA, Silicon Valley and Mecklenburg. They have an RFP (multi-agency with fire & rescue, including complaint management) on the street now for major parts of their system, but the requirement in this is to support EPS in the future, it's not actually part of the proposal.

c. Authority data:

• Size of jurisdiction: 399 sq. miles

• Staff count: 151 FTE, 27 plan review (C&R), 80 inspections, 38 in permits

• Permits issued/year: 87,785, including 27,756 building

• B/E/M/P inspections per year: 275,022

• Annual budget: not available

• Construction value permitted: in FY2001, \$1.472 b

3.3 West Palm Beach, FL

a. Contact: Rick Jones (561-659-8096, e-mail; RJones@ci.west-palm-beach.fl.us)

b. EPS status

They are looking seriously into Electronic Plan Review. They are starting work on this through a contract with FileNet to develop a digital archival process for all completed projects. Currently they can scan completed plans and documents onto an optical disk. Next step is to setup two experimental review stations to test plan review by this medium. FileNet has the software for this as well and in house staff is developing the workflow product.

They are \$250,000 into this project with another \$170,000 to go to achieve Electronic Plan Review. This will include Pentium IV computers and 42" plasma screens for each reviewer.

They did pre-start research in Fort Lauderdale and Jupiter. The former tried to implement new Electronic Plan Review all at once and it failed. Jupiter began on a smaller scale for acclimation. West Palm Beach is going to do something in between.

c. Authority data:

• Size of jurisdiction: 60 sq. miles

• Staff count: 59 FTE, 12 plan review, 24 inspectors

• Permits issued/year: 18,000 +/-

• B/E/M/P inspections per year: 70,000 +/-

• Annual budget: \$6.5m

3.4 Phoenix, AZ

a. Contact: Greg Morgan (ph 602-262-7811, e-mail: greg.morgan@phenix.gov)

b. EPS status

Began EPS study in 1999 as part of Silicon Valley Smart Permitting analysis. Their City Manager and Government focused on a Phoenix Smart Permitting initiative and, in the 3rd year, part of this has been to assign 2 staff to experiment with EPS. However, they see other customer service and process issues as first needs, including; having a common metro, if not statewide codes, as well as focusing on web enablement of process and IVR use in inspections. They noted Phoenix is committed to advances in permitting and inspection technology but this is heavily tempered with the reality of working with "Joe Six-Pack in his truck". Phoenix doesn't have a time line for implementing EPS. The events of 9/11 put a lot of initiatives on hold

EPS work currently is focused on receiving plat maps. Other staff EPS research has identified the following concerns.

- They need to develop metro plan review submission criteria for this to work well.
- Maintaining EPS system process and data may create inefficiency, consuming more plan review staff time than it saves.
- Based on their research on West Coast, software doesn't appear to be there yet. The Silicon Valley authorities studied, actually printed out the plans and did a paper review.
- Their study of Voloview indicated the red line capability isn't there yet.
- There is a big cultural difference between working with plans and working with a big screen.

As of today, the other automation issues noted continue to be a higher priority, especially real time field data. They still have 1-2 staff looking at EPS; they know the problems, resources and issues. However, the other priorities come first, so they have no horizon date or implementation plan for EPS.

c. Authority data:

- Size of jurisdiction: 427 sq. miles
- Staff count: 350 FTE +/- with 150 inspectors
- Permits issued/year: approx. 30,000
- B/E/M/P inspections per year: approx. 175,000
- Annual budget: not available

3.5, Clark County/Las Vegas, NV

a. Contact: Dan Owens (ph 702-455-5686, e-mail; dso@co.clark.nv.us)

b. EPS status

Clark County is not actively pursuing it because they have a series of concerns which they don't see technology addressing at this time, including

- Working without a paper copy would be difficult.
- Printing after the review is complete would be complicated and something they don't currently do.
- You have to have the software, and even if you have that, your computers have to be able to handle the workload.
- In short, they don't see much benefit.

c. Authority data:

- Size of jurisdiction: not available
- Staff count: not available
- Permits issued/year: not available
- B/E/M/P inspections per year: not available
- Annual budget: not available

3.6 Santa Clara, CA

a. Contact: Sheila Lee (ph 408-615-2430; slee@ci.santa-clara.ca.us)

b. EPS status

She worked on an EPS development program in Palo Alto 5 years ago. A consortium of A/E's and facility managers developed a submit-and-review process and tested it many times. It was used on one commercial project. When she left Palo Alto, the initiative stopped.

In Santa Clara, she's been focusing on permit tracking, automated inspection request, automated field inspection and on-line plan check and inspection status. Electronic Plan Review is 2nd up on her priority list and she thinks she'll have something to report in another year.

c. Authority data:

• Size of jurisdiction: 19.3 sq. miles

• Staff count: 8 permit center/plan review staff, 10 inspectors

• Permits issued/year: 7,000

• B/E/M/P inspections per year: 23,073

• Annual budget: \$2.4m

3.7 San Jose, CA

a. Contact: Dave Bopf (ph 418-277-4541, e-mail; Dave.Bopf@ci.sj.ca.us)

b. EPS status

San Jose looked into this and other e-permitting issues as part of the consortium of Bay Area cities, known as the Smart Permit Initiative (http://www.jointventure.org/initiatives/smartpermit/pilot.html is the project website address). Currently, San Jose has postponed implementation due to technical issues and lack of customer demand for service.

c. Authority data:

• Size of jurisdiction: 177 sq. miles

• Staff count:173 FTE in building div, 23 plan review, 86 inspectors, 18 permit techs

• Permits issued/year: 37,600, including 8,900 plan reviews

• B/E/M/P inspections per year: 207,000 +/-

• Annual budget: \$23m

3.8 Palm Beach County, FL

a. Contact: Angela Boyett-Helker (ph 561-233-5050, e-mail; Aboyett@co.palm-beach.fl.us)

b. EPS status

Just beginning to look at this. Currently working on developing an enterprise automation system, which will address EPS, but this is at least a year away. Also, currently have an RFP in development to implement records management.

c. Authority data:

• Size of jurisdiction: 2500 sq. miles

• Staff count: 380 FTE

• Permits issued/year: 38,836

• B/E/M/P inspections per year: 260, 036

• Annual budget: \$23.77m

3.9 Jacksonville, FL

a. Contact: Jim Schock, Assistant Director (ph 904-630-2628, e-mail; schock@coj.net)

b. EPS status

Their vision is to receive a complete application/drawing file electronically, starting in Zoning, than routing through Engineering and than finally through Building Review.

They are currently installing document imaging hardware and software. Their overall implementation strategy is to start with imaging permits, add archived drawings next, than next year start looking at electronic work flow submission. Once they start, they think it will take a year to bring it on line, with anticipated problems/issues including:

- Security of drawings so there are no changes
- Electronic sealing of drawings
- File type to allow comments at plan review
- Common format for use on the Internet

d. Authority data:

- Size of jurisdiction: 840 sq. miles
- Staff count: 107 FTE's, 8 plan review, 55 inspectors
- Permits issued/year: 80,240
- B/E/M/P inspections per year: 208,992
- Annual budget: \$8,000,000 +/-

3.10 Tampa, FL

a. Contact: John Barrios (ph 813-493-0045)

b. EPS status

Little or no investigation to date. Currently negotiating contract with Hansen on upgrading their electronic capacity. Electronic Plan Submittal will be Phase II of this project, maybe 2 years out. EPS will be studied along with digital archiving.

c. Authority data:

- Size of jurisdiction: not available
- Staff count: 100+/- FTE; 42 inspectors, 18 plan review
- Permits issued/year: 42,000
- B/E/M/P inspections per year: 142,000
- Annual budget: not available

3.11 Austin, TX

a. Contact: Janet Gallagher (ph 512-974-2089)

b. EPS status

Austin is pursuing a data base design from preliminary plat to CO. It will not include EPS. Currently, they are a paper process. They now have inspections on the Internet, and soon will have MEP permits. Next phase, in place in 18 mos, is main code enforcement data base, including field lap tops and customer data access. Tried EPS and hated it; used a CADD system; data was too big for their system and it couldn't handle it.

c. Authority data:

- Size of jurisdiction: 274 sq miles; inspector territory @ 340 sq m (covering part of Travis County)
- Staff count: 104 FTE, 73 inspectors, 17 plan review, 4 permit technicians
- Permits issued/year: 48,000 +/-
- B/E/M/P inspections per year: 175,000
- Annual budget: \$4.2m

3.12 San Antonio, TX

a. Contact: Florencio Pena (ph 210-207-8248, e-mail; fpena@sanantonio.gov)

b. EPS status

Currently negotiating a contract with Hansen for Development Services software. This will include document management application, part of which will be EPS. Cost will be about 1.5m for this new software. However, EPS isn't at the top of the implementation schedule; they currently have it planned for a 2004 availability date (2 years out).

c. Authority data:

- Size of jurisdiction: 400 sq. miles
- Staff count: 185 FTE, 30 plan review, 38 inspectors
- Permits issued/year: 6,000 new residential, 2,800 commercial
- B/E/M/P inspections per year: 178,000
- Annual budget: \$9.3m

3.13 Indianapolis, IN

- a. Contact: Rosalie Hinton (ph 317-327-3971, e-mail; rhinton@indygov.org)
- **b. EPS status:** No response
- e. Authority data:
- Size of jurisdiction: not available
- Staff count: not available
- Permits issued/year: not available
- B/E/M/P inspections per year: not available
- Annual budget: not available

3.14 Norfolk, VA

a. Contact: Tom Kapsha (ph 757-664-6565, e-mail; thomas.kapsha@norfolk.gov)

b. EPS status

Not currently researching EPS. First addressing document management, internet project tracking and inspection requests, as well as IVR upgrades. Eventually, they will look at electronic storage of plans, and at that time, they may look at EPS.

f. Authority data:

- Size of jurisdiction: 66 sq. miles
- Staff count: 47 FTE, 2 plan reviewers, 25 inspectors
- Permits issued/year: 14,000 +/-
- B/E/M/P inspections per year: 37,500 +/-
- Annual budget: \$1.5

3.15 Denver, CO

a. Contact: Steve Draper, Director (ph 720-865-2974, e-mail; steve.draper@ci.denver.co.us)

b. EPS status

They are currently researching EPS and think it will help their customers. They believe it will take 5 years to implement, at a cost of \$5 m, given the changes both in hardware and software. They have determined this will require minimum 21" monitors and computers capable of handling high-speed graphics. Most of their customers use Auto-Cad.

c. Authority data:

• Size of jurisdiction: 154 sq. miles

• Staff count: 135 FTE, 35 plan review, 70 inspections, 35 zoning

• Permits issued/year: 51,123

• B/E/M/P inspections per year: 199,625

• Annual budget: \$10.4m

3.16 Seattle, WA

a. Contact: Sam Kurle (206-684-5385, e-mail; sam.kurle@ci.seattle.wa.us)

b. EPS status

No response

g. Authority data:

- Size of jurisdiction: not available
- Staff count: not available
- Permits issued/year: not available
- B/E/M/P inspections per year: not available
- Annual budget: not available

3.17 San Diego, CA

a. Contact: Jason Mahlin (ph 619-446-5406, e-mail; jmahlin@SanDiego.gov)

b. EPS status

First piloted EPS in October, 2000. This included giving a select group of staff new hardware and software, using Voloview Autodesk. Used dual monitors (19" or 21") for each reviewer, allowing for a markup copy separate from navigation of documents. Pilot concluded neither hardware nor software made plan review easier/faster for staff. Specific problems noted include:

- Not easy to see changes, or verify they've been made.
- Requires large screens and these are expensive.
- Optimally, would like reviewers to have flat screens in a desk top.
- Need a link within plans to quickly reference details or blown up plans.
- Didn't figure out how to "stamp" the final set.

c. Authority data:

- Size of jurisdiction: 340 sq. miles
- Staff count: 430 FTE, including 47 plan review, 78 inspectors, 131 land dev't, review, 68 proj.mgmt., 45 support, 57 info sys.
- Permits issued/year: 33,624
- B/E/M/P inspections per year: 167,473
- Annual budget: \$42m

3.18 Jupiter, FL

a. Contact: Robert Lecky, Director (ph 561-741-2286, e-mail; robertl@jupiter.fl.us)

b. EPS status:

This was a referral from West Palm Beach. They looked at EPS, but the project was placed on the back burner when: a) they couldn't identify customer demand for use, and b) they couldn't establish software serving most customers needs. The high cost of monitor equipment was also an issue. They like the idea, but right now EPS falls behind field automation as a priority. So, EPS wouldn't be worked on for another year or two.

d. Authority data:

• Size of jurisdiction: 22 sq. miles

• Staff count: 40 FTE, 4 plan review plus chief, 9 inspectors plus chief

• Permits issued/year: 11,000

• B/E/M/P inspections per year: 25,000

• Annual budget: \$2.5m

Part 4: Virtual Plan Rooms and other options

Of the 18 authorities contacted for this report, all those responding have predicated their research and implementation on electronically receiving plans in house. There is another possible option in addressing the need for EPS. We found one authority, Glenwood Village, Colorado, pursuing this route.

Virtual Plan Room is an electronic service that allows for the distribution of construction project information, including construction documents, to anyone accessing the system. In other words, this is a 3rd party service, which holds the construction documents for anyone to view.

Users may view and download/ print project information or drawings. The service is open 24/7 and requires only Windows 95/98 or NT and Internet connection. The virtual Plan Room may be accessed by Internet, or local dial up, or established as a private service. Users simply log on, highlight the job they wish to see, with the related documents becoming available for review. If necessary, documents may be printed from this service by download.

As of the date of this report, we have not received assessment comments for Glenwood Village, regarding how effectively this program works, the volume involved, size of project documents, etc.

One consideration to this approach to EPS is the long-term availability of this service. In recent years the overall technology market has been volatile, with some small vendors disappearing from the market altogether. For example, one vendor we referenced in 1999, Pidgeohole.com, appears to be gone from the scene. So the long term viability of the service would need to be assured.

A second consideration is the ability of such a service to handle all types of drawing formats, not just CADD. To date, we haven't found a vendor with this capability. Other plan rooms face the same technical challenge, often dictating the drawing formats eligible for participation..

- FW Dodge was contacted and advised their process receives drawings in a paper format and scans them into a single format accessible by subscribers over the Internet.
- Contact was also made with AGC. They currently follow a process similar to FW Dodge on the vast majority of reference plans. They do have limited electronic transfer programs with NCDOT and the US Army Corp of Eng., which they are considering expanding.

Part 5: Code Enforcement EPS hands on work to date

- In 1999, Voloview was introduced to Engineering & Building Standards. A small committee began to research the fit between Voloview software and our goals for Electronic Plan Submittal. We examined an on-line demo and participated in a conference call.
- In early 2000, Cadre Systems, Inc. was introduced to Engineering & Building Standards. Kris Dell and Jennifer Wilson of Cadre met with staff and performed an Autodesk demonstration.
- In June 2000, we negotiated a contract with Frameworks Technologies Corporation for their ActiveProject Software. We agreed to a 90-day pilot at a cost of \$7,500 plus actual travel expenses with the understanding that at the completion of the pilot, a contract for \$58,000 would follow. Our account representative was Keith Tyson.
- Pilot would consist of website design, website creation, end-user training, hosting and technical support.
- We purchased two pieces of equipment for the pilot a 36" monitor and a new computer system with dual monitors.
- We checked references and contacted Chet Helt and Little & Associates to participate in the pilot.
- By July 15, 2000, Frameworks Technologies had decided that the scope of the project far exceeded their quote and asked for an additional \$22,000 for a total pilot cost of \$29,500, claiming that the pilot would front end the whole software package capabilities. The team aborted the project due to cost.
- In August 2000, we contact Little & Associates, who had done business with Frameworks and asked for another idea. They again suggested Voloview.
- We downloaded the trial version of Voloview and tried it using some of the projects Little & Associates had already permitted. The viewing capabilities were fine, but it was impossible to email the drawings, as they were too large. We then tried to compress them, but they were still too large. The problem was that it took too long to transmit which caused the sending computer to "time out" and abort the send. We were successful at viewing documents sent on CD ROM, but the resolution was somewhat compromised, along with the reviewer's ability to review the drawings quickly.
- To date, we have not had an active interest in submitting on CD-ROM, however we did entertain one project, but the architect chose to go through Express Review instead.
- In June 2001, the technology team asked that we table further exploration in order to concentrate on the Plan Review System, and assigned the project to Tammy Dixon in Property Assessment and Land Records Management.
- In January 2002, Mecklenburg County's Property Assessment and Land Records Management took over the sponsorship of an Integrated Land Records Pilot Project using electronic plan submittal to review single family subdivision site plans and record maps.
- To date, Land Records Management focus .has been site plan submittals. Work on Building EPS is scheduled to begin later this year.